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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,623	01/10/2005	Takeshi Aso	040302-0454	9757

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EXAMINER	
ENIN-OKUT, EDUE	

ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/520,623	ASO ET AL.	
	Examiner	Art Unit	
	Edu E. Enin-Okut	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 October 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *17,19-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *17,19-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

FUEL CELL SYSTEM AND CONTROL METHOD

Detailed Action

1. The amendments filed on October 22, 2009 were received. Applicants have amended claims 17 and 19-32; and, cancelled claim 18. Currently, claims 17 and 19-32 are pending.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

3. Claims 17, 19-28 and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nonobe (US 6,158,537) in view of Kimura et al. (US 5,964,309) is maintained.

Regarding claim 17, Nonobe teaches a fuel cell system [power supply system 10] (Abstract) including an energy supply comprising a fuel cell [20], a power distributor [relay 42] connected to the fuel cell, and a secondary cell [storage battery 30] connected to the fuel cell via the power distributor (9:44-60); a load set [motor 32, auxiliary equipment 34] connected to the power distributor (9:54-56); and a controller [control unit 50] (9:51-52, 9:59-60).

As to configuring the controller to control the power distributor to warm the energy supply when the fuel cell system is started up, Nonobe teaches that a controller, control unit 50, is constructed as a logic circuit including a microprocessor and a CPU, a ROM, a RAM, and an input/output port (10:14-16). The controller [control unit 50] is configured to control the power distributor [relay 42] to warm a vehicle's energy supply [storage battery 30 and fuel cells 20] upon its start-up (i.e., when the vehicles starter switch is switched on) (9:32-33, 12:64-13:14).

As to a warm-up mode being based upon the possible generation of the fuel cell and the possible discharge of the secondary cell regardless of power consumption of the load other than the auxiliary

equipment, Kimura teaches a power supply system for an electric vehicle that, at the time of starting the system, estimates output electric current of the fuel cells based on the observed remaining charge of the storage battery and an amount of electric power required for auxiliary machinery, and supplies required amounts of gases to the fuel cells based on the estimated output electric current (Abstract; 10:38-64; 11:9-32). The system has a fuel cell stack, a storage battery and a control unit constructed as an arithmetic and logic circuit including a microcomputer, and a CPU performing a variety of arithmetic operations (5:28-35, 9:13-10:10). The CPU estimates the output current of the fuel cells and storage battery [possible generation of the fuel cell and possible discharge of secondary battery] (12:13-23). Upon start-up, if the battery requires charging (i.e., warming-up), the calculations result in a higher estimate of current from the fuel cell (as compared to that obtained when the storage battery does not require charging) and the fuel cells supplies electric power to the storage battery and auxiliary machinery (11:21-24, 12:24-27). If the storage battery does not require charging when the system is started, both the fuel cell and storage battery provide power to auxiliary machinery (11:9-11, 12:29-32).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to base a warm-up mode on the possible generation of the fuel cell and the possible discharge of the secondary cell, regardless of the power consumption of the load other than the auxiliary equipment, used in system of Nonobe because Kimura teaches that it is a means with which to control the driving state of respective elements of a power supply system, such as facilitating the cooperation between its storage battery and fuel cells in the supply of power to a load (see Kimura, 8:17-19, 10:8-10).

As to the power distributor warming the energy supply by alternately repeated switching of a frist power distribution unit and a second power distribution unit, one of ordinary skill in the art would appreciate that, depending on whether the fuel cell stack used in the system of Nonobe, as modified by Kimura, requires warming-up or its storage battery requires charging, the power distributor will

repeatedly switch between the warm-up of the fuel cell stack or charging of the storage battery during operation of its electric vehicle, as required.

Regarding claims 19, Nonobe teaches a remaining charge monitor 46, e.g., a voltage sensor or a SOC meter, which measures the power charge of the secondary cell [storage battery 30]. One would appreciate that the controller used in the system of Nonobe, as modified by Kimura, is capable of being configured to control its first power of the energy supply, as recited by the functional language of claim 17, because all the structural limitations upon which this claim depends have been taught by Nonobe. See MPEP 2114.

Regarding claim 20, Nonobe teaches a detection system [temperature sensor] configured to detect a first temperature of the fuel cell (13:7-10) and a second temperature of the secondary cell (14:56-58). One would appreciate that the controller of Nonobe, as modified by Kimura, is capable of being configured to have its first power of the energy supply increase, as the first temperature is lower in rising speed than the second temperature; and the second power decrease and the third power increase, as the first temperature is higher in rising speed than the second temperature, as recited by the functional language of claim 17, because all the structural limitations upon which this claim depends have been taught by Nonobe. See MPEP 2114.

Regarding claim 21, Nonobe teaches a controller [control unit 50] in communication with a SOC [SOC meter] of the secondary cell [storage battery 30] (10:6-11). Therefore, one would appreciate that that the controller of Nonobe, as modified by Kimura, is capable of being configured to determine a first power of its energy supply within a limited range depending on an SOC of the secondary cell, as recited by the functional language of claim 17, because all the structural limitations upon which this claim depends have been taught by Nonobe. See MPEP 2114.

Regarding claims 22-27, one would appreciate that the controller of Nonobe, as modified by Kimura, can be configured to perform the steps recited by the functional language of claims 22-27,

because all the structural limitations upon which these claims depend (i.e., see claim 2) have been taught by Nonobe. See MPEP 2114.

Regarding claim 28, Nonobe teaches that the auxiliary equipment comprises an oxidizer supply configured to supply an oxidizer to the fuel cell [air compressor 66] (8:63-66).

Further, one would appreciate that the controller of Nonobe, as modified by Kimura, is capable of being configured to increase power consumption at the oxidizer supply [air compressor 66] for the oxidizer to be supplied by an increased flow rate at an increased pressure, to increase the fourth power, as recited by the functional language of claim 5, because all the structural limitations upon which this claim depends have been taught by Nonobe. See MPEP 2114.

Regarding claim 30, one would appreciate that the controller of Nonobe, as modified by Kimura, can be configured to perform the steps recited by the functional language of claim 14, because all the structural limitations upon which this claim depends (i.e., see claim 2) have been taught by Nonobe. See MPEP 2114.

Regarding claim 31, it has been held that, to be entitled to weight in method claims, the recited structure limitations therein must affect the method in a manipulative sense, and not to amount to the mere claiming of a use of a particular structure. *Ex parte Pfeiffer*, 135 USPQ 31 (BPAI 1961). It should be noted that the structure recited in the preamble of this claim has been addressed above with respect to claim 17.

As to steps recited in the claim, Nonobe teaches a control method including:

- when the fuel cell system is started up (12:64-13:14), controlling the power distributor [relay 42] to warm the energy supply by alternatively repeating a first power distribution [IF4] and a second power distribution [IF1+IB1] (10:66-11:13, 11:52-60);
- wherein the first power distribution unit has a first power generated at the fuel cell [IF4] and distributed to the secondary cell [IB4<0]and the load set [It4] (11:52-60); and

- wherein the second power distribution [IF1+IB1] has a combination of a second power generated at the fuel cell [IF1] and third power discharged from the secondary cell [IB1], distributed to the load set [motor 32, auxiliary equipment 34] (10:66-11:13).

Further, as discussed above with respect to claim 17, Kimura teaches that the warm-up at the time of starting the system of Nonobe, as modified by Kimura, can proceed regardless of power consumption of the load other than the auxiliary equipment. The remaining limitations recited in this claim have been addressed above with respect to claim 17.

Regarding claim 32, the limitations recited in this claim have been addressed above with respect to claim 17.

4. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nonobe and Kimura as applied to claims 17-28 and 30-31 above, further in view of Mufford et al. (US 6,186,254).

Nonobe and Kimura are applied and incorporated herein for the reasons above.

Regarding claim 29, Nonobe teaches that the auxiliary equipment also includes a cooling system [water pump] configured for a water cooling of the fuel cell, with a cooling water line (8:66-9:3).

However, Nonobe and Kimura do not expressly teach the cooling system with a radiator provided with a cooling fan, and a bypass member to bypass the radiator.

Mufford teaches a temperature regulating system for a fuel cell powered electric motor vehicle for maintaining fuel cell stack temperature within a temperature range that provides satisfactory cell performance (Abstract). The fuel cell stack 30 includes a coolant inlet port 45 and a coolant outlet port 50 (3:63-67). A plurality of cooling medium conduits or pipes 55 define a coolant path through which the cooling medium flows between the coolant outlet port 50 of the fuel cell stack 30 and the coolant inlet port 45 (4:5-8). The cooling medium also next encounters a bypass valve 100 that controls coolant flow

to a radiator 105 and a radiator bypass path 110 (4:53-55). Coolant passing through the radiator 105 is cooled by air flow over the radiator 105, via the use of a variable speed fan 115 or the like (5:8-12).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the radiator, cooling fan and bypass member in the system of Nonobe, as modified by Kimura, because Mufford teaches that their inclusion can ensure satisfactory stack performance by regulating the stack temperature.

Further, that artisan would also appreciate the controller of Nonobe, as modified by Kimura and Mufford, is capable of being configured for operation of its bypass member to increase power consumption at the cooling fan, to increase the fourth power, as recited by the functional language of claim 29, because all the structural limitations upon which this claims depends have been taught by Nonobe and Mufford. See MPEP 2114.

Response to Arguments

5. Applicant's arguments filed October 22, 2009 have been fully considered but they are not persuasive. In sum, applicant makes the following arguments:

> (a) The Nonobe reference does not teach "... alternately repeated switching of a first power distribution unit and a second power distribution unit regardless of the power consumption of the load other than the auxiliary equipment." (see p. 7)
>
> (b) "... Kimura fails to disclose a secondary cell being repeatedly and alternately charged and discharged, regardless of power consumption of the load other than the auxiliary equipment, when the system is started up. ..." (see p. 8)
>
> (c) "... Because the controller of each of the dependent claims 19-30 are programmed for a particular function (a special purpose controller), they are structurally different from the controller of Nonobe as modified by Kimura (a general purpose controller) that is not programmed for the respective particular function. Accordingly, Nonobe and Kimura do not teach or suggest the controller of each of the dependent claims 19-30, and these claims are allowable." (see p. 8-10)

6. As to applicant's argument (a) and (b) above, first, it is noted that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Further, the Kimura reference teaches that its power supply system estimates output electric current of the fuel cells based on the observed remaining charge of the storage battery and *an amount of electric power required for auxiliary machinery* (emphasis added), and supplies required amounts of gases to the fuel cells based on the estimated output electric current, as discussed in the rejection of the amended claim 17 above.

7. As to applicant's argument (c) above, applicant contends that the court decision in *In re Noll* (545 F.2d 141) supports this argument. However, upon review of that decision, it appears applicant fails to appreciate the claims in question before the court in that case recite physical structures being programmed to perform specific functions. Applicant's contention that the programming itself creates "structure" is unsupported by the decision in *Noll*.

8. As to the remainder of applicant's arguments, those arguments have been considered; however, applicant has amended the claims such that new grounds of rejection were necessitated.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing

date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Edu E. Enin-Okut** whose telephone number is **571-270-3075**. The examiner can normally be reached on Monday to Thursday, 7 a.m. - 3 p.m. (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on 571-272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edu E. Enin-Okut/
Examiner, Art Unit 1795

/Dah-Wei D. Yuan/
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